

## The Miyawaki Planting System: A Revolutionary Approach to Afforestation

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### INTRODUCTION

In an era where deforestation and environmental degradation are global concerns, innovative afforestation techniques are essential. One such technique that has drawn a lot of interest from people all around the world is the Miyawaki Planting System. Especially in urban and degraded landscapes this method which was created by Japanese botanist Dr. Akira Miyawaki, provides a quick durable and effective means of restoring forests.

#### What is the Miyawaki method?

The Miyawaki method is a unique afforestation technique designed to create dense, self-sustaining forests in a short period. The use of native plant species and the promotion of rapid development through dense plantation replicate natural ecosystems. Because Miyawaki forests are 30 times denser, grow 10 times faster, and support 100 times more species than traditional regeneration operations, which can take decades to create. Urban planners, environmentalists, and conservationists who want to green degraded or bare areas favor it because of this. Miyawaki method is a one such potential technique of restoring the forest and ecology as well (Miyawaki., 1999).

#### Key principles of the Miyawaki method

- 1. Selection of native species:** The Miyawaki method points out the use of native species that are inherently located in the region. This enhances easier adaptation of the plants to the soils and climatic conditions within the region, which fosters healthier and more sustainable growth.
- 2. High-density planting:** In Miyawaki technique, trees and plants are planted at a high density of 3-5 saplings per square meter making sure it is closely spaced. Due to competition of nutrients and sunlight by this thick planting, the trees develop higher and at a higher rate. This leads to the rapid growth of the forest and its self-sufficiency in a short period of time.

**3. Four-layered structure: The forest has several layers, and they are:**

- Shrub layer (small shrubs and bushes)
- Sub-tree layer (median trees)
- Tree layer (tall trees)
- Canopy layer (trees of the greatest growth)

**4. Rapidity:** With the presence of competition and fertile soil preparation, Miyawaki forests are ready to grow up to 20-30 years, as opposed to the 100-200 years conventional forests take to be ready.

**5. Less maintenance:** Once the forest has gone through a period of 2-3 years of initial care, it becomes self-sufficient and does not need much or no human activity.

**Steps to implement a miyawaki forest**

Miyawaki method process (steps)

The Miyawaki method is followed in a scientific manner, following a step-by-step process. these steps are as follows:

**Step 1: Site selection**

The Miyawaki forest can be established even in small spaces of at least 20 square feet, especially near in urban and degraded landscapes.

**Step 2: Check soil composition**

The Miyawaki method begins by the analysis of the soil type to determine its fertility, water retention and overall healthiness in general to support the growth of forests. This measure is useful to find out the capacity of the soil to support vegetation. Organic manure like cow dung manure, goat manure and vermicompost are also added to enhance the quality of the soil. The roots are assisted in penetrating deeper into the soil with the aid of Penetration materials such as rice husk and wheat husk as well as the peanut shell. Coconut coir and peat are water retainers that improve the ability of soil to retain water. Also, the soil is covered with mulch formed with the help of rotten leaves or dry bark or compost to protect the soil against the excessive sunlight, balance the humidity of the soil, and control the growth of weeds.

**Step 3: Selecting native species for plantation**

The next step consists in the selection of native species of plants as to their type, either deciduous or evergreen, their height, and their ecological

value. A diversified composition of plant species is selected in the forest. Most popular native plants of the surrounding area should make about 40 to 50 percent. Planters then select 3-5 species as the predominant foundation species of the forest. The other 25-40 percent of the plantation is comprised of companion species; the rest is attributed to minor shrubs and species. Planting saplings should be 60 to 80 cm in height in order to be successfully planted.

**Step 4: Land preparation**

Before planting begins, the land is carefully prepared. Every weed, debris, and other undesirable materials are cleared to make the soil fit to support afforestation. The amount of sunlight on the site should be at least 8 to 9 hours each day and adequate irrigation facilities should be available. At least 100 square meters is piled up to raise the planting area and the planting sites are pre-marked to facilitate systematic planting.

**Step 5: Plantation**

Once the land is prepared, the tree planting process Pits about one meter deep are dug, and saplings are placed carefully into them. The soil on the ground surrounding the sapling stems is provided a soft level to enhance growth. The young saplings are provided with support sticks to ensure that they are not bent or broken. Mulching with rice husk, wheat husk, peanut shells, coconut fiber and peat serve to ensure suppression of soil moisture as well as ensuring faster growth.

**Step 6: Caring for the forest**

The final step involves continuous care and maintenance of the newly planted forest. The first three years entail weeding on a regular basis and taken care of the plants. These involve watering every day, weeding, and clearing plastic debris, and proper drainage. The mulch should be spaced out and checked and replaced every year and the growth of the plants checked to avoid overcrowding. The use of chemical fertilizers and pesticides must be discouraged and organic fertilizers together with natural pesticides promoted. Given due attention, the Miyawaki forest will produce at an alarming rate time 10 times faster and vegetation 30 times denser than

the conventional forests. Three years of care result in the self-sustenance of the forest. Traditional forest requires almost 100 years to grow and the Miyawaki practice helps to grow a forest in the span of 20 to 30 years.

#### Benefits of the Miyawaki planting system

- **Biodiversity boost:** One significant advantage is the encouragement of biodiversity. The approach introduces a range of trees, shrubs, and ground plants into the environment because it emphasizes planting only native species. Because of this diversity, the habitat becomes rich and well-balanced, attracting birds, butterflies, bees, and other creatures. As a result of urbanization or deforestation, it also aids in the restoration of natural vegetation
- **Carbon sequestration:** The Miyawaki system also plays an important role in carbon sequestration. The resultant densification of the planting and the high rate of growth enables these forests to take in atmospheric carbon dioxide at a greater rate over a relatively short period. This, therefore, provides a practical solution to curb the effects of climatic change, especially in urban areas where air pollution and greenhouse gas emissions are very pronounced.
- **Improved air quality:** In addition, Miyawaki forests act as natural shields against pollution. The dense vegetation filters dust, smoke, and harmful particles from the air, significantly improving air quality. They also serve as sound barriers, reducing noise pollution in busy cities. At the same time, they help regulate local climate by lowering temperatures, increasing humidity, and reducing the urban heat island effect.
- **Soil restoration:** Soil improvement is another critical advantage. The dense root systems of closely planted saplings bind the soil together, preventing erosion and increasing stability. At the same time, the constant shedding of leaves enriches the soil with organic matter, boosting its fertility. The improved soil structure also enhances water retention, helping recharge groundwater and reducing the risk of floods during heavy rains.
- **Urban cooling:** The Miyawaki method is especially valuable in urban areas where land

is scarce. Even small patches of unused land, such as around schools, offices, or along roadsides, can be transformed into dense mini-forests. These green spaces not only beautify cities but also improve the quality of life by offering shade, reducing stress, and providing recreational value.

- **Community involvement:** Socially, these forests create awareness about environmental conservation. Communities often take part in planting drives, which encourages people, especially children, to connect with nature. The sense of ownership and responsibility toward these forests further promotes sustainable practices.

Seeing the importance of the Miyawaki system, it has recently been developed at the Matadin Valmiki Tapowan of Chaudhary Charan Singh University Campus, Meerut in which local species of plants are being specially planted. Under this method, 3 to 5 plants are being planted per square meter. The local species mainly include Peepal, Amla, Bel, Neem, Karanj, Hibiscus, Kaner, Moringa, Guava, Kanak Champa, Drumstick Morpankhi, Teak, Arjun and selected Indigenous tree and shrub Species. The plants have been planted in four layers, due to which a dense and multi-layered forest is rapidly developing.

#### CONCLUSION

The Miyawaki Planting System offers a powerful, sustainable solution to environmental degradation and urban pollution. The successful establishment of the Miyawaki forest in the CCSU campus demonstrates how degraded or unused land can be transformed into a vibrant, self-sustaining ecosystem within a short period. As more institutions adopt this technique, the dream of a greener and healthier planet comes closer to reality.

As more communities, governments, and organizations adopt this method, the vision of a greener, healthier planet comes closer to reality. Whether implemented on a small scale in urban spaces or across large tracts of degraded land, the Miyawaki method proves that restoring nature is possible, one dense forest at a time.

## TAPOVAN – LIVING LAYERS OF NATURE

### CANOPY TREES

S. No.	Plant name (Common – Botanical)
1	Arjun ( <i>Terminalia arjuna</i> )
2	Banyan ( <i>Ficus benghalensis</i> )
3	Bel Patthar ( <i>Aegle marmelos</i> )
4	Gular ( <i>Ficus racemosa</i> )
5	Jacaranda ( <i>Jacaranda mimosifolia</i> )
6	Jungle Jalebi ( <i>Pithecolobium dulce</i> )
7	Malnu ( <i>Madhuca longifolia</i> )
8	Neem ( <i>Azadirachta indica</i> )
9	Peepal ( <i>Ficus religiosa</i> )
10	Pilkhan ( <i>Ficus virous</i> )
11	Sagun ( <i>Tectona grandis</i> )
12	Saptarni ( <i>Astonia scholaris</i> )
13	Silver oak ( <i>Grevillea robusta</i> )
14	Weeping Fig ( <i>Ficus benjamina</i> )

### SHRUBS

S. No.	Plant name (Common – Botanical)
1	Bamboo ( <i>Bambusa bambos</i> )
2	Ber ( <i>Ziziphus mauritiana</i> )
3	Bougainvillea ( <i>Bougainvillea glabra</i> )
4	Harshringar ( <i>Nyctanthes arbor-tristis</i> )
5	Indian Laurel ( <i>Ficus panda</i> )
6	Ivy ( <i>Hedera helix</i> )
7	Karonda ( <i>Carissa carandas</i> )
8	Madar ( <i>Calotropis procera</i> )

### SUB TREE

S. No.	Plant name (Common – Botanical)
1	Curry leaf ( <i>Murraya koenigii</i> )
2	Gurhal ( <i>Hibiscus rosa-sinensis</i> )
3	Jatropha ( <i>Jatropha curcas</i> )
4	Kachnar ( <i>Bauhinia variegata</i> )
5	Kanuk Champa ( <i>Pterospermum acerifolium</i> )
6	Kaner ( <i>Cascabela thevetia</i> )

### MEDICINAL PLANT

S. No.	Plant name (Common – Botanical)
1	Akatkara ( <i>Anacyclus pyrethrum</i> )
2	Arajita ( <i>Clitoria ternatea</i> )
3	Ashwagandha ( <i>Withania somnifera</i> )
4	Astana Bel ( <i>Tylophora indica</i> )
5	Brahmi ( <i>Bacopa monnieri</i> )
6	Dracaena ( <i>Dracaena fragrans</i> )
7	Duranta ( <i>Duranta indica</i> )
8	Hadjod ( <i>Cissus quadrangularis</i> )
9	Insulin Plant ( <i>Chamaecostus cuspidatus</i> )
10	Kalmegh ( <i>Andrographis paniculata</i> )
11	Lemon grass ( <i>Cymbopogon citratus</i> )
12	Marwa ( <i>Origanum majorana</i> )
13	Paan ( <i>Piper betel</i> )
14	Rosemary ( <i>Salvia rosmarinum</i> )
15	Sadabahar ( <i>Catharanthus roseus</i> )
16	Snake plant ( <i>Sanseveria trifasciata</i> )
17	Tulsi ( <i>Ocimum tenuiflorum</i> )

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